

SEQUENCE LISTING

<110> Kawasaki, Hiroaki
Graybiel, Ann
Housman, David

<120> Genes Integrating Signal Transduction Pathways

<130> MIT-103

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<150> US 60/105,507

<151> 1998-10-23

<150> US 60/108,685

<151> 1998-11-16

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<222> (166)..(1989)

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Leu Gly His Leu Ala Lys Gly Ala Ser Leu Asp Asp Leu Ile Asp Ser
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Cys Ile Gln Ser Phe Asp Ala Asp Gly Asn Leu Cys Arg Ser Asn Gln
70 75 80
ctg ttg caa gtc atg ctg acc atg cac cga att gtc atc tcc tct gca 403
Leu Leu Gln Val Met Leu Thr Met His Arg Ile Val Ile Ser Ser Ala
85 90 95 100
gaa ctg ctc caa aaa gtt atc acc ctc tat aag gat gct ttg gca aag 451
Glu Leu Leu Gln Lys Val Ile Thr Leu Tyr Lys Asp Ala Leu Ala Lys
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aat tca cca gga ctt tgc ctg aag atc tgt tat ttt gta agg tat tgg 499
Asn Ser Pro Gly Leu Cys Leu Lys Ile Cys Tyr Phe Val Arg Tyr Trp
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Ile Thr Glu Phe Trp Val Met Phe Lys Met Asp Ala Ser Leu Thr Asp
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Thr Met Glu Glu Phe Gln Glu Leu Val Lys Ala Lys Gly Glu Glu Leu
150 155 160
cat tgc cgc ctg att gac aca act caa atc aat gcc cgt gac tgg tcc 643
His Cys Arg Leu Ile Asp Thr Thr Gln Ile Asn Ala Arg Asp Trp Ser
165 170 175 180

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Arg	Lys	Leu	Thr	Gln	Arg	Ile	Lys	Ser	Asn	Thr	Ser	Lys	Lys	Arg	Lys	
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gtc	tcc	ctg	ctc	ttt	gac	cat	ctg	gaa	cca	gaa	gag	cta	tcc	gag	cac	739
Val	Ser	Leu	Leu	Phe	Asp	His	Leu	Glu	Pro	Glu	Glu	Leu	Ser	Glu	His	
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Leu	Thr	Tyr	Leu	Glu	Phe	Lys	Ser	Phe	Arg	Arg	Ile	Ser	Phe	Ser	Asp	
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Glu	Arg	Ser	Ile	Ala	Leu	Cys	Asn	Gly	Ile	Ser	Gln	Trp	Val	Gln	Leu	
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Met	Val	Leu	Ser	Arg	Pro	Thr	Pro	Gln	Leu	Arg	Ala	Glu	Val	Phe	Ile	
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Lys	Phe	Ile	Gln	Val	Ala	Gln	Lys	Leu	His	Gln	Leu	Gln	Asn	Phe	Asn	
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Thr	Leu	Met	Ala	Val	Ile	Gly	Gly	Leu	Cys	His	Ser	Ser	Ile	Ser	Arg	
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Val	His	Leu	Lys	Asp	Leu	Ile	Ser	Leu	Tyr	Glu	Ala	Met	Pro	Asp	Tyr	
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Leu	Gly	Asp	Gly	Lys	Val	Asn	Val	His	Lys	Leu	Leu	Ala	Leu	Tyr	Asn	
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Tyr	Thr	Glu	Asp	Glu	Ile	Tyr	Glu	Leu	Ser	Tyr	Ala	Arg	Glu	Pro	Arg	
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Asn	His	Arg	Ala	Pro	Pro	Leu	Thr	Pro	Ser	Lys	Pro	Pro	Val	Val	Val	
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Lys	His	Val	Gln	Arg	Met	Val	Asp	Ser	Val	Phe	Lys	Asn	Tyr	Asp	His	
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Asp	Gln	Asp	Gly	Tyr	Ile	Ser	Gln	Glu	Glu	Phe	Glu	Lys	Ile	Ala	Ala	
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Ser	Phe	Pro	Phe	Ser	Phe	Cys	Val	Met	Asp	Lys	Asp	Arg	Glu	Gly	Leu	
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Ile	Ser	Arg	Asp	Glu	Ile	Thr	Ala	Tyr	Phe	Met	Arg	Ala	Ser	Ser	Ile	
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Tyr	Ser	Lys	Leu	Gly	Leu	Gly	Phe	Pro	His	Asn	Phe	Gln	Glu	Thr	Thr	
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Tyr	Leu	Lys	Pro	Thr	Phe	Cys	Asp	Asn	Cys	Ala	Gly	Phe	Leu	Trp	Gly	
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Lys	Gln	Cys	Lys	Asp	Leu	Val	Val	Phe	Glu	Cys	Lys	Lys	Arg	Ala	Lys	
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 Glu Glu Leu Asp Leu Ile Phe Glu Glu Leu Val His Ile Lys Ala Val
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 Ala His Leu Ser Asn Ser Val Lys Arg Glu Leu Ala Ala Val Leu Leu
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Thr Cys Ser Glu Gln Ser Leu Ser Thr Arg Ser Pro Ala Ser Thr Trp
845 850 855 860

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Gln Ala Thr Thr Glu His Val His Lys Ala Gly Lys Leu Leu Tyr Arg
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Ile Leu Ala Leu Gly Leu Gly Val His Ser Arg Ser Gln Ala Val Gly
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Ile Cys Gln Val Leu Leu Asp Glu Gly Ala Leu Cys His Val Lys His
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Asp Trp Thr Phe Gln Asp Arg Asp Ala Gln Phe Tyr Arg Phe Pro Gly
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 Val Ala Leu Arg Lys Ser Pro Gly Gln Arg Thr Asp Glu Glu Leu Asp
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 Pro Thr Pro Gly Arg Asn Arg Tyr Thr Val Met Ser Gly Thr Pro Glu
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 Leu Glu Asn Gly Cys Gly Asn Val Ser Pro Gln Thr Lys Ala Arg Asn
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Ala Pro Val Trp Phe Pro Asn His Glu Glu Pro Leu Pro Ser Ser Ala
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Asp His Ser Val Leu Thr Leu His Leu Pro Val Thr Ala Ser Val Arg
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Val Val Asp Pro Gln Glu Val His Glu Leu Thr Pro His Pro Glu Gln
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Lys Asp Leu Ala Gly Gln Leu Thr Glu His Asp Trp Asn Leu Phe Asn
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Pro Gly Pro Arg Ala Gln Leu Leu Arg Lys Phe Ile Lys Leu Ala Ala
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Gly Leu Ser Asn Ser Ala Ile Ser Arg Leu Ala His Thr Trp Glu Arg
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Asp Pro Ser Trp Asn His Arg Val Tyr Arg Leu Ala Leu Thr Lys Leu
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Ser Pro Pro Val Ile Pro Phe Met Pro Leu Leu Leu Lys Asp Met Thr
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Phe Ile His Glu Gly Asn His Thr Leu Val Glu Asn Leu Ile Asn Phe
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Arg Ser His Ser Thr Ala Pro Leu Ser Pro Leu Arg Ser Arg Val Ser
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His Ile His Glu Asp Ser Gln Ala Ser Arg Ile Ser Thr Cys Ser Glu
835 840 845

Gln Ser Leu Ser Thr Arg Ser Pro Ala Ser Thr Trp Ala Tyr Val Gln
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 Ile Cys Gln Val Leu Leu Asp Glu₁₂₀ Gly Ala Leu Cys His₁₂₅ Val Lys His
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 Pro Glu Pro Glu Pro Val₁₅₀ Gly Thr His Glu Met₁₅₅ Glu Glu Glu Leu Ala₁₆₀
 Glu Ala Val Ala Leu₁₆₅ Leu Ser Gln Arg Gly₁₇₀ Pro Asp Ala Leu Leu Thr₁₇₅
 Val Ala Leu Arg₁₈₀ Lys Pro Pro Gly Gln Arg Thr Asp Glu Glu Leu Asp₁₉₀
 Leu Ile Phe₁₉₅ Glu Glu Leu Leu His₂₀₀ Ile Lys Ala Val Ala₂₀₅ His Leu Ser
 Asn Ser₂₁₀ Val Lys Arg Glu Leu₂₁₅ Ala Ala Val Leu Leu Phe Glu Pro His
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 Trp Tyr Ile Ile Trp₂₄₅ Lys Gly Ser Val Asn Val Val Thr His Gly₂₅₅ Lys
 Gly Leu Val Thr₂₆₀ Thr Leu His Glu Gly₂₆₅ Asp Asp Phe Gly Gln Leu Ala
 Leu Val Asn₂₇₅ Asp Ala Pro Arg Ala₂₈₀ Ala Thr Ile Ile Leu Arg Glu Tyr
 Asn Cys₂₉₀ His Phe Leu Arg Val₂₉₅ Asp Lys Gln Asp Phe Asn Arg Ile Ile
 Lys Asp Val Glu Ala Lys₃₁₀ Thr Met Arg Leu Glu₃₁₅ Glu His Gly Lys Val₃₂₀
 Val Leu Val Leu Glu₃₂₅ Arg Ala Ser Gln Gly₃₃₀ Ala Gly Pro Ser Arg Pro
 Pro Thr Pro Gly₃₄₀ Arg Asn Arg Tyr Thr Val Met Ser Gly Thr₃₅₀ Pro Asp
 Lys Ile Leu Glu Leu Leu Leu Glu₃₆₀ Ala Met Gly Leu Asp₃₆₅ Ser Ser Ala
 His Asp Pro Lys Glu Thr Phe₃₇₅ Leu Ser Asp Phe Leu₃₈₀ Leu Thr His Arg

Val Phe Met Pro Ser Ala Gln Leu Cys Ala Ala Leu Leu His His Phe
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Cys Asn Lys Arg Gln Gln Ile Leu Arg Leu Val Ser Gln Trp Val Ala
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Gln Val Gly Asp Lys Val Pro Tyr Asp Ile Cys Arg Pro Asp His Ser
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Pro Gln Glu Val His Glu Leu Ile Pro His Pro Asp Gln Leu Gly Pro
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Ala Gly Gln Leu Thr Asp His Asp Trp Ser Leu Phe Asn Ser Ile His
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Arg Ala Gln Leu Leu Lys Lys Phe Ile Lys Leu Ala Ala His Leu Lys
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Lys Val Arg Lys Leu Tyr Ser Ala Leu Glu Arg Leu Leu Asp Pro Ser
740 745 750

Trp Asn His Arg Val Tyr Arg Leu Ala Leu Ala Lys Leu Ser Pro Pro
755 760 765
Val Ile Pro Phe Met Pro Leu Leu Leu Lys Asp Met Thr Phe Ile His
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Glu Gly Asn His Thr Leu Val Glu Asn Leu Ile Asn Phe Glu Lys Met
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Met Val Leu Arg Arg Met
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Pro Asn Leu Ile Arg Asp Arg Lys Tyr His Leu Arg Leu Tyr Arg Gln
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 tacgcagagc tgggaggagg gacagagtca gtaccagagt cggaaaaaag caggggtggga 3833
 aggggaacct gagtcaggag acttgccctg caggcgctgc cctgccagca gaggcctgac 3893
 agtggtttcc atgaactgca tccctgctgt gggctgggac agggccactg acacagtatc 3953
 ggagcacaga aggggaaagg agcaggaggg attccaactc tgccagttag cagctgtgtg 4013
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 aaaaataata cttttgtcaa aaaaaaaaaa aaaaaa 4109

<210> 14
 <211> 556
 <212> PRT
 <213> Homo sapiens

<400> 14
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 Leu Leu Glu His Gln His Pro Ser Cys Ile Gln Gly Leu Arg Trp Thr
 20 25 30

Pro Leu Thr Asn Ser Glu Glu Ser Leu Asp Phe Ser Glu Ser Leu Glu
35 40 45
Gln Ala Ser Thr Glu Arg Val Leu Arg Ala Gly Arg Gln Leu His Gln
50 55 60
His Leu Leu Ala Thr Cys Pro Asn Leu Ile Arg Asp Arg Lys Tyr His
65 70 75 80
Leu Arg Leu Tyr Arg Gln Cys Cys Ser Gly Arg Glu Leu Val Asp Gly
85 90 95
Ile Leu Ala Leu Gly Leu Gly Val His Ser Arg Ser Gln Val Val Gly
100 105 110
Ile Cys Gln Val Leu Leu Asp Glu Gly Ala Leu Cys His Val Lys His
115 120 125
Asp Trp Ala Phe Gln Asp Arg Asp Ala Gln Phe Tyr Arg Phe Pro Gly
130 135 140
Pro Glu Pro Glu Pro Val Gly Thr His Glu Met Glu Glu Glu Leu Ala
145 150 155 160
Glu Ala Val Ala Leu Leu Ser Gln Arg Gly Pro Asp Ala Leu Leu Thr
165 170 175
Val Ala Leu Arg Lys Pro Pro Gly Gln Arg Thr Asp Glu Glu Leu Asp
180 185 190
Leu Ile Phe Glu Glu Leu Leu His Ile Lys Ala Val Ala His Leu Ser
195 200 205
Asn Ser Val Lys Arg Glu Leu Ala Ala Val Leu Leu Phe Glu Pro His
210 215 220
Ser Lys Ala Gly Thr Val Leu Phe Ser Gln Gly Asp Lys Gly Thr Ser
225 230 235 240
Trp Tyr Ile Ile Trp Lys Gly Ser Val Asn Val Val Thr His Gly Lys
245 250 255
Gly Leu Val Thr Thr Leu His Glu Gly Asp Asp Phe Gly Gln Leu Ala
260 265 270
Leu Val Asn Asp Ala Pro Arg Ala Ala Thr Ile Ile Leu Arg Glu Tyr
275 280 285
Asn Cys His Phe Leu Arg Val Asp Lys Gln Asp Phe Asn Arg Ile Ile
290 295 300
Lys Asp Val Glu Ala Lys Thr Met Arg Leu Glu Glu His Gly Lys Val
305 310 315 320
Val Leu Val Leu Glu Arg Ala Ser Gln Gly Ala Gly Pro Ser Arg Pro
325 330 335
Pro Thr Pro Gly Arg Asn Arg Tyr Thr Val Met Ser Gly Thr Pro Asp
340 345 350
Lys Ile Leu Glu Leu Leu Leu Glu Ala Met Gly Leu Asp Ser Ser Ala
355 360 365
His Asp Pro Lys Glu Thr Phe Leu Ser Asp Phe Leu Leu Thr His Arg
370 375 380
Val Phe Met Pro Ser Ala Gln Leu Cys Ala Ala Leu Leu His His Phe
385 390 395 400

His Val Glu Pro Ala Gly Gly Ser Glu Gln Glu Arg Ser Thr Tyr Val
 405 410 415
 Cys Asn Lys Arg Gln Gln Ile Leu Arg Leu Val Ser Gln Trp Val Ala
 420 425 430
 Leu Tyr Gly Ser Met Leu His Thr Asp Pro Val Ala Thr Ser Phe Leu
 435 440 445
 Gln Lys Leu Ser Asp Leu Val Gly Arg Asp Thr Arg Leu Ser Asn Leu
 450 455 460
 Leu Arg Glu Gln Trp Pro Glu Arg Arg Arg Cys His Arg Leu Glu Asn
 465 470 475 480
 Gly Cys Gly Asn Ala Ser Pro Gln Met Lys Val Ser Ala Trp Pro Gln
 485 490 495
 Phe Leu Ser Ser Ala Pro Pro Gly Leu Gln Ala Pro Pro Ser Pro Pro
 500 505 510
 Asp Pro Glu Gly Leu Cys Gly Arg Gly Lys Leu Ser Ser His Arg His
 515 520 525
 Thr Leu Gly Ser Leu Ile Gly Val His Gly Ala Leu Ala Ala Cys Gly
 530 535 540
 Ala Leu Gly Gln Ala Val Pro Gly Gly Ala Glu Ala
 545 550 555

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 <212> DNA
 <213> Rattus norvegicus

<220>
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 <222> (3)..(875)
 <223> cAMP-GEFII

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 Gly Val Leu Lys Pro Asn Asp Val Ser Val Phe Thr Thr Leu Thr 15
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 att aat gga cgc ctg ttt gcc tgc ccg cga gag caa ttc gac tca ctg 95
 Ile Asn Gly Arg Leu Phe Ala Cys Pro Arg Glu Gln Phe Asp Ser Leu 20 25 30
 act ccc ttg cca gaa cag gag ggc ccg acc act ggg aca gtg ggg acg 143
 Thr Pro Leu Pro Glu Gln Glu Gly Pro Thr Thr Gly Thr Val Gly Thr 35 40 45
 ttt gaa ctg atg agc tcg aaa gac ttg gcg tac cag atg aca acg tat 191
 Phe Glu Leu Met Ser Ser Lys Asp Leu Ala Tyr Gln Met Thr Thr Tyr 50 55 60
 gac tgg gaa ctc ttc aac tgt gtg ctc gag ctg gag cta atc tac cac 239
 Asp Trp Glu Leu Phe Asn Cys Val Leu Glu Leu Glu Leu Ile Tyr His 65 70 75
 aca ttt gga agg cat aat ttt aaa aag acc aca gca aac ttg gat ttg 287
 Thr Phe Gly Arg His Asn Phe Lys Lys Thr Thr Ala Asn Leu Asp Leu 80 85 90 95
 ttc ctg agg aga ttt aat gaa att cag ttt tgg gtt gtc act gag atc 335
 Phe Leu Arg Arg Phe Asn Glu Ile Gln Phe Trp Val Val Thr Glu Ile 100 105 110

tgc Cys	ctt Leu	tgt Cys	tcc Ser 115	cag Gln	ctc Leu	agc Ser	aag Lys	cgt Arg 120	gtt Val	cag Gln	ctt Leu	ttg Leu	aaa Lys 125	aaa Lys	tgt Cys	383	
atc Ile	aag Lys	ata Ile 130	gcg Ala	gct Ala	cac His	tgc Cys	aag Lys 135	gag Glu	tac Tyr	aaa Lys	aac Asn	ttg Leu 140	aat Asn	tcc Ser	ttc Phe	431	
ttc Phe	ggc Gly 145	atc Ile	gtc Val	atg Met	ggg Gly	ctc Leu 150	agt Ser	aac Asn	gtg Val	gct Ala	gag Glu 155	agc Ser	cgc Arg	ctg Leu	gca Ala	479	
tta Leu 160	aca Thr	tgg Trp	gag Glu	aaa Lys	ctg Leu 165	ccg Pro	agc Ser	aag Lys	ttt Phe	aag Lys 170	aag Lys	ttc Phe	tat Tyr	gcg Ala	gag Glu 175	527	
ttt Phe	gag Glu	agc Ser	tta Leu	atg Met 180	gat Asp	cct Pro	tcc Ser	aga Arg	aat Asn 185	cac His	aag Lys	gcg Ala	tac Tyr	agg Arg 190	ctg Leu	575	
aca Thr	gca Ala	gct Ala	aaa Lys 195	ctg Leu	gag Glu	ccc Pro	ccc Pro	ctc Leu 200	atc Ile	cct Pro	ttc Phe	atg Met	ccc Pro 205	ttg Leu	ctt Leu	623	
att Ile	aaa Lys	gat Asp 210	atg Met	aca Thr	ttt Phe	act Thr	cat His 215	gag Glu	ggg Gly	aac Asn	aag Lys	aca Thr 220	ttc Phe	att Ile	gac Asp	671	
aat Asn	cta Leu 225	gta Val	aac Asn	ttt Phe	gaa Glu	aaa Lys 230	atg Met	cgc Arg	atg Met	att Ile	gca Ala 235	aat Asn	act Thr	gcc Ala	aga Arg	719	
acg Thr 240	gtg Val	cgc Arg	tac Tyr	tac Tyr	agg Arg 245	agc Ser	cag Gln	cca Pro	ttc Phe	aat Asn 250	ccg Pro	gat Asp	gct Ala	gct Ala	caa Gln 255	767	
gct Ala	aat Asn	aag Lys	aac Asn	cat His 260	cag Gln	gat Asp	gtc Val	cgg Arg	agt Ser 265	tat Tyr	gta Val	cgg Arg	caa Gln	tta Leu 270	aat Asn	815	
gtg Val	att Ile	gac Asp	aac Asn 275	cag Gln	aga Arg	act Thr	tta Leu	tca Ser 280	cag Gln	atg Met	tca Ser	cac His	aga Arg 285	tta Leu	gag Glu	863	
cct Pro	cgc Arg	agg Arg 290	cca Pro	tagacatctg				cagtgcccag			agtgatgctc		cgtctccagt			915	
ccacaatctt			tcaaaaagatg			ctgtgtatgc			tactactgac			tgtgttgcta			ctagagaatt		975
ccccagaatg			agcaagagac			acctcctgag			agcccctcgg			ggccacatcc			tgctttccga		1035
ccacacagga			gaaggatctg			tcttgtctaa			cgcggacatg			ccgtagctta			ggaaccatca		1095
gctgtagtca			tcttcttcac			ggttggcaca			ccaccgcagg			ctcacgtgaa			ggcataacct		1155
ggcgagggcta			caccaggccc			ctgacatccc			ttcccagggt			gttgccagcat			gagactgtcc		1215
cgtggatagg			tttgacttgg			aatcgctgca			atgatataat			tgaatgattt			gtttacttag		1275
caccttatctt			ggggctctggg			ttctgggggag			gggtgttgacc			ataaaagtcc			aaattatcca		1335
tcatgttcct			ccatcgtcat			aatcttacct			ctgaaggaat			ggaacctcat			cacaacacta		1395
tgaaacatta			tgactgtt														

accaaggttc ttaatatcgc cagcgtaaag atagaaagta acatttcaga agagcacaat 1575
 atacacaaaa ctttttttca aattgaaata ttttcctggg cattaaaaaa cctttccact 1635
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 aaaatcttaa ttttcagcaa ttgttttgca ctttcagata gattgtaaat aggttatgca 1755
 gtcaatggta tagaattatt tatttgctac ataatagaca ttgtgcaaaa taattccttt 1815
 ttattttatt tattcagtat gaaattttgg agtacatttt ttctgttttc ttaattagac 1875
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 tcattaaata tacttgacaa gaaaaaaaaa a 1966

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 <212> PRT
 <213> Rattus norvegicus

<400> 16
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 1 5 10 15
 Asn Gly Arg Leu Phe Ala Cys Pro Arg Glu Gln Phe Asp Ser Leu Thr
 20 25 30
 Pro Leu Pro Glu Gln Glu Gly Pro Thr Thr Gly Thr Val Gly Thr Phe
 35 40 45
 Glu Leu Met Ser Ser Lys Asp Leu Ala Tyr Gln Met Thr Thr Tyr Asp
 50 55 60
 Trp Glu Leu Phe Asn Cys Val Leu Glu Leu Glu Ile Tyr His Thr
 65 70 75 80
 Phe Gly Arg His Asn Phe Lys Lys Thr Thr Ala Asn Leu Asp Leu Phe
 85 90 95
 Leu Arg Arg Phe Asn Glu Ile Gln Phe Trp Val Val Thr Glu Ile Cys
 100 105 110
 Leu Cys Ser Gln Leu Ser Lys Arg Val Gln Leu Leu Lys Lys Cys Ile
 115 120 125
 Lys Ile Ala Ala His Cys Lys Glu Tyr Lys Asn Leu Asn Ser Phe Phe
 130 135 140
 Gly Ile Val Met Gly Leu Ser Asn Val Ala Glu Ser Arg Leu Ala Leu
 145 150 155 160
 Thr Trp Glu Lys Leu Pro Ser Lys Phe Lys Lys Phe Tyr Ala Glu Phe
 165 170 175
 Glu Ser Leu Met Asp Pro Ser Arg Asn His Lys Ala Tyr Arg Leu Thr
 180 185 190
 Ala Ala Lys Leu Glu Pro Pro Leu Ile Pro Phe Met Pro Leu Leu Ile
 195 200 205
 Lys Asp Met Thr Phe Thr His Glu Gly Asn Lys Thr Phe Ile Asp Asn
 210 215 220
 Leu Val Asn Phe Glu Lys Met Arg Met Ile Ala Asn Thr Ala Arg Thr
 225 230 235 240
 Val Arg Tyr Tyr Arg Ser Gln Pro Phe Asn Pro Asp Ala Ala Gln Ala

	245		250		255
Asn Lys Asn His Gln Asp Val Arg Ser Tyr Val Arg Gln Leu Asn Val	260		265		270
Ile Asp Asn Gln Arg Thr Leu Ser Gln Met Ser His Arg Leu Glu Pro	275		280		285
Arg Arg Pro	290				

<210> 17
 <211> 3013
 <212> DNA
 <213> Homo sapiens

<220>
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 <222> (407)..(2953)
 <223> cAMP-GEFII

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 aggggaataac attatttcgc cagggtgata tggaacaaac tggatgtctg cctggcaggg 180
 tctttggatg ttaaagtatc tgagaccagc agtcaccagg atgctgtgac catctgtacc 240
 ctgggaattg ggacggcctt tggagagtcc attctggaca acacaccccg ccatgcaacc 300
 atcgttacca gggagagcag tgaactgctc cgcacgcagc agaaggactt caaggcacta 360
 tgggagaaat atcgacagta tatggcagga cttctggctc ctcctt atg gta tta 415
 Met Val Leu
 1
 tgg aaa cgg gct cta aca atg aca gga ttc ctg aca agg aga aca cac 463
 Trp Lys 5 Arg Ala Leu Thr Met Thr Gly Phe Leu Thr Arg Arg Thr His
 10 15
 ctc att gaa cct cac gtt cct ctt cgt cct gct aac acc att acc aag 511
 Leu Ile Glu Pro His Val Pro Leu Arg Pro Ala Asn Thr Ile Thr Lys
 20 25 30 35
 gtc cct tca gag aag atc ctc aga gct gga aaa att tta cga aat gcc 559
 Val Pro Ser Glu Lys Ile Leu Arg Ala Gly Lys Ile Leu Arg Asn Ala
 40 45 50
 att ctc tct cga gca cct cac atg ata aga gat aga aaa tac cac cta 607
 Ile Leu Ser Arg Ala Pro His Met Ile Arg Asp Arg Lys Tyr His Leu
 55 60 65
 aag aca tac aga caa tgc tgt gtg gga act gaa ctg gtg gac tgg atg 655
 Lys Thr Tyr Arg Gln Cys Cys Val Gly Thr Glu Leu Val Asp Trp Met
 70 75 80
 atc gac gag aca cca tgt gtt cac tcc cgg act caa gct gtt ggc atg 703
 Ile Asp Glu Thr Pro Cys Val His Ser Arg Thr Gln Ala Val Gly Met
 85 90 95
 tgg caa gtc ctg tta gaa gat ggt gtt ctc aac cac gtg gac cag gag 751
 Trp Gln Val Leu Leu Glu Asp Gly Val Leu Asn His Val Asp Gln Glu
 100 105 110 115
 cac cat ttc caa gac ttt tat tta ttc tat cga ttt ctg gat gat gag 799
 His His Phe Gln Asp Phe Tyr Leu Phe Tyr Arg Phe Leu Asp Asp Glu

120								125					130					
cac His	gag Glu	gat Asp	gcc Ala 135	cct Pro	ttg Leu	cct Pro	act Thr	gag Glu 140	gag Glu	gag Glu	aag Lys	aag Lys	gag Glu 145	tgt Cys	gat Asp	847		
gag Glu	gag Glu	ctc Leu 150	cag Gln	gac Asp	acc Thr	atg Met	ctg Leu 155	ctg Leu	ctg Leu	tca Ser	cag Gln	atg Met 160	ggc Gly	ccc Pro	gac Asp	895		
gcc Ala	cac His 165	atg Met	agg Arg	atg Met	atc Ile	ctt Leu 170	cgc Arg	aaa Lys	cca Pro	cct Pro	ggc Gly 175	cag Gln	agg Arg	act Thr	gtg Val	943		
gat Asp 180	gac Asp	cta Leu	gag Glu	att Ile	atc Ile 185	tat Tyr	gag Glu	gag Glu	ctt Leu	ctt Leu 190	cat His	att Ile	aaa Lys	gcc Ala	tta Leu 195	991		
tcc Ser	cat His	ctt Leu	tct Ser	acc Thr 200	aca Thr	gtg Val	aaa Lys	cga Arg	gag Glu 205	tta Leu	gca Ala	ggt Gly	gtt Val	ctc Leu 210	att Ile	1039		
ttt Phe	gag Glu	tct Ser	cac His 215	gcc Ala	aaa Lys	gga Gly	ggg Gly	act Thr 220	gtg Val	ttg Leu	ttt Phe	aac Asn	cag Gln 225	ggg Gly	gaa Glu	1087		
gaa Glu	ggt Gly	acc Thr 230	tcc Ser	tgg Trp	tac Tyr	att Ile	att Ile 235	cta Leu	aaa Lys	gga Gly	tca Ser	gtg Val 240	aat Asn	gta Val	gtc Val	1135		
att Ile	tac Tyr 245	ggc Gly	aag Lys	ggt Gly	gtg Val	gtc Val 250	tgc Cys	acc Thr	ctg Leu	cat His	gaa Glu 255	gga Gly	gat Asp	gac Asp	ttc Phe	1183		
ggc Gly 260	aag Lys	tta Leu	gca Ala	cta Leu	gtg Val 265	aat Asn	gat Asp	gcc Ala	cca Pro	cga Arg 270	gct Ala	gcc Ala	tct Ser	atc Ile	gtc Val 275	1231		
tta Leu	cga Arg	gaa Glu	gat Asp	aac Asn 280	tgc Cys	cat His	ttc Phe	tta Leu	aga Arg 285	gta Val	gac Asp	aag Lys	gag Glu	gat Asp 290	ttc Phe	1279		
aac Asn	cgg Arg	atc Ile	cta Leu 295	agg Arg	gac Asp	gtg Val	gag Glu	gcg Ala 300	aat Asn	aca Thr	gtc Val	aga Arg	ctt Leu 305	aaa Lys	gaa Glu	1327		
cat His	gac Asp	caa Gln 310	gat Asp	gtc Val	ttg Leu	gtg Val	ctg Leu 315	gag Glu	aag Lys	gtc Val	cca Pro	gca Ala 320	ggg Gly	aac Asn	aga Arg	1375		
gct Ala	tct Ser 325	aat Asn	caa Gln	gga Gly	aac Asn	tca Ser 330	cag Gln	cct Pro	cag Gln	caa Gln	aag Lys 335	tat Tyr	act Thr	gtg Val	atg Met	1423		
tca Ser 340	gga Gly	aca Thr	cct Pro	gaa Glu	aaa Lys 345	att Ile	tta Leu	gag Glu	cat His	ttt Phe 350	cta Leu	gaa Glu	aca Thr	ata Ile	cgc Arg 355	1471		
ctt Leu	gag Glu	gca Ala	act Thr	tta Leu 360	aat Asn	gaa Glu	gca Ala	aca Thr	gat Asp 365	tct Ser	gtt Val	tta Leu	aat Asn	gac Asp 370	ttt Phe	1519		
att Ile	atg Met	atg Met	cac His 375	tgt Cys	gtt Val	ttt Phe	atg Met	cca Pro 380	aat Asn	acc Thr	cag Gln	ctt Leu	tgc Cys 385	ccg Pro	gca Ala	1567		
ctg Leu	gtg Val	gcc Ala 390	cac His	tac Tyr	cac His	gca Ala 395	cag Gln	cct Pro	tca Ser	caa Gln	ggt Gly	aca Thr 400	gaa Glu	cag Gln	gag Glu	1615		

aaa atg gat tat gcc ctc aac aat aag agg cga gtc atc cgc ctg gtt Lys Met Asp Tyr Ala Leu Asn Asn Lys Arg Arg Val Ile Arg Leu Val 405 410 415	1663
cta cag tgg gct gcc atg tat gga gac ctc ctg caa gag gat gac gta Leu Gln Trp Ala Ala Met Tyr Gly Asp Leu Leu Gln Glu Asp Asp Val 420 425 430 435	1711
tct atg gcc ttc ctg gag gag ttt tat gta tct gta tca gat gat gcc Ser Met Ala Phe Leu Glu Glu Phe Tyr Val Ser Val Ser Asp Asp Ala 440 445 450	1759
cgg atg att gct gcc ctc aag gag caa ctg cca gag ttg gag aag att Arg Met Ile Ala Ala Leu Lys Glu Gln Leu Pro Glu Leu Glu Lys Ile 455 460 465	1807
gtc aag caa atc tca gaa gat gca aag gca cca caa aag aag cac aag Val Lys Gln Ile Ser Glu Asp Ala Lys Ala Pro Gln Lys Lys His Lys 470 475 480	1855
gtt ctt ttg caa cag ttc aat acg ggc gat gag aga gcc cag aag cgc Val Leu Leu Gln Gln Phe Asn Thr Gly Asp Glu Arg Ala Gln Lys Arg 485 490 495	1903
cag cct atc cgc ggc tct gat gaa gtt ctg ttt aag gtc tat tgc atg Gln Pro Ile Arg Gly Ser Asp Glu Val Leu Phe Lys Val Tyr Cys Met 500 505 510 515	1951
gac cac acc tac aca acc att cgg gtg cca gtg gcc act tcg gtg aag Asp His Thr Tyr Thr Thr Ile Arg Val Pro Val Ala Thr Ser Val Lys 520 525 530	1999
gaa gtc atc agt gca gtt gcc gac aag ctg ggc tcc ggg gag ggc ctg Glu Val Ile Ser Ala Val Ala Asp Lys Leu Gly Ser Gly Glu Gly Leu 535 540 545	2047
atc ata gtc aag atg agt tcc gga gga gaa aag gtg gtg ctc aaa cct Ile Ile Val Lys Met Ser Ser Gly Gly Glu Lys Val Val Leu Lys Pro 550 555 560	2095
aat gat gtt tca gta ttt acg acg ctc acc att aat gga cgc ctg ttt Asn Asp Val Ser Val Phe Thr Thr Leu Thr Ile Asn Gly Arg Leu Phe 565 570 575	2143
gct tgc ccg cga gag caa ttc gat tca ctg act ccc tta cca gaa cag Ala Cys Pro Arg Glu Gln Phe Asp Ser Leu Thr Pro Leu Pro Glu Gln 580 585 590 595	2191
gaa ggc cca act gtt gga aca gtg gga act ttt gaa ctg atg agc tcc Glu Gly Pro Thr Val Gly Thr Val Gly Thr Phe Glu Leu Met Ser Ser 600 605 610	2239
aaa gat tta gca tac cag atg aca att tat gat tgg gaa ctc ttc aac Lys Asp Leu Ala Tyr Gln Met Thr Ile Tyr Asp Trp Glu Leu Phe Asn 615 620 625	2287
tgc gtg cat gag ctg gag cta atc tat cac aca ttt gga agg cat aat Cys Val His Glu Leu Glu Leu Ile Tyr His Thr Phe Gly Arg His Asn 630 635 640	2335
ttt aaa aag acc aca gca aac ttg gat ttg ttc ctg agg aga ttt aat Phe Lys Lys Thr Thr Ala Asn Leu Asp Leu Phe Leu Arg Arg Phe Asn 645 650 655	2383
gaa att cag ttt tgg gtc gtc act gag atc tgc ctt tgt tct cag ctc Glu Ile Gln Phe Trp Val Val Thr Glu Ile Cys Leu Cys Ser Gln Leu 660 665 670 675	2431

agc aag cgt gtt cag cta tta aaa aaa ttt att aag ata gca gcc cac 2479
Ser Lys Arg Val Gln Leu Leu Lys Lys Phe Ile Lys Ile Ala Ala His
680 685 690

tgt aag gag tat aaa aat ctg aat tcc ttt ttt gcc atc gtc atg gga 2527
Cys Lys Glu Tyr Lys Asn Leu Asn Ser Phe Phe Ala Ile Val Met Gly
695 700 705

cta agt aac att gct gtg agc cgc ttg gca cta acg tgg gag aaa ctg 2575
Leu Ser Asn Ile Ala Val Ser Arg Leu Ala Leu Thr Trp Glu Lys Leu
710 715 720

cca agc aag ttc aag aag ttc tat gcg gag ttt gaa agt tta atg gac 2623
Pro Ser Lys Phe Lys Lys Phe Tyr Ala Glu Phe Glu Ser Leu Met Asp
725 730 735

cct tca agg aac cac agg gcc tac agg ctg aca gta gct aag ctg gaa 2671
Pro Ser Arg Asn His Arg Ala Tyr Arg Leu Thr Val Ala Lys Leu Glu
740 745 750 755

cct cct ctc atc ccc ttc atg cct ttg ctc att aaa gat atg aca ttt 2719
Pro Pro Leu Ile Pro Phe Met Pro Leu Ile Lys Asp Met Thr Phe
760 765 770

act cat gag ggg aac aag acg ttc att gac aat cta gta aac ttt gaa 2767
Thr His Glu Gly Asn Lys Thr Phe Ile Asp Asn Leu Val Asn Phe Glu
775 780 785

aaa atg cgc atg att gca aat acg gcc aga aca gtg aga tac tac agg 2815
Lys Met Arg Met Ile Ala Asn Thr Ala Arg Thr Val Arg Tyr Tyr Arg
790 795 800

agc caa ccc ttc aat cct gat gca gct caa gct aat aag aac cat cag 2863
Ser Gln Pro Phe Asn Pro Asp Ala Ala Gln Ala Asn Lys Asn His Gln
805 810 815

gat gtc cgg agt tat gta cgg caa tta aat gtg att gac aac cag aga 2911
Asp Val Arg Ser Tyr Val Arg Gln Leu Asn Val Ile Asp Asn Gln Arg
820 825 830 835

act tta tca cag atg tca cac aga tta gag cct cgt cga cca 2953
Thr Leu Ser Gln Met Ser His Arg Leu Glu Pro Arg Arg Pro
840 845

tagacatttc aaatgcccaa agcaacagtt tgtctccagt ccacaatttt caaaaatgcc 3013

<210> 18
<211> 849
<212> PRT
<213> Homo sapiens

<400> 18
Met Val Leu Trp Lys Arg Ala Leu Thr Met Thr Gly Phe Leu Thr Arg
1 5 10 15

Arg Thr His Leu Ile Glu Pro His Val Pro Leu Arg Pro Ala Asn Thr
20 25 30

Ile Thr Lys Val Pro Ser Glu Lys Ile Leu Arg Ala Gly Lys Ile Leu
35 40 45

Arg Asn Ala Ile Leu Ser Arg Ala Pro His Met Ile Arg Asp Arg Lys
50 55 60

Tyr His Leu Lys Thr Tyr Arg Gln Cys Cys Val Gly Thr Glu Leu Val
65 70 75 80

Asp Trp Met Ile Asp Glu Thr Pro Cys Val His Ser Arg Thr Gln Ala

				85				90				95			
Val	Gly	Met	Trp 100	Gln	Val	Leu	Leu	Glu 105	Asp	Gly	Val	Leu	Asn 110	His	Val
Asp	Gln	Glu 115	His	His	Phe	Gln	Asp 120	Phe	Tyr	Leu	Phe	Tyr 125	Arg	Phe	Leu
Asp	Asp 130	Glu	His	Glu	Asp	Ala 135	Pro	Leu	Pro	Thr	Glu 140	Glu	Glu	Lys	Lys
Glu 145	Cys	Asp	Glu	Glu	Leu 150	Gln	Asp	Thr	Met	Leu 155	Leu	Leu	Ser	Gln	Met 160
Gly	Pro	Asp	Ala 165	His	Met	Arg	Met	Ile 170	Leu	Arg	Lys	Pro	Pro	Gly 175	Gln
Arg	Thr	Val	Asp 180	Asp	Leu	Glu	Ile	Ile 185	Tyr	Glu	Glu	Leu	Leu 190	His	Ile
Lys	Ala	Leu 195	Ser	His	Leu	Ser	Thr 200	Thr	Val	Lys	Arg	Glu 205	Leu	Ala	Gly
Val	Leu 210	Ile	Phe	Glu	Ser	His 215	Ala	Lys	Gly	Gly	Thr 220	Val	Leu	Phe	Asn
Gln 225	Gly	Glu	Glu	Gly	Thr 230	Ser	Trp	Tyr	Ile	Ile 235	Leu	Lys	Gly	Ser	Val 240
Asn	Val	Val	Ile 245	Tyr	Gly	Lys	Gly	Val	Val 250	Cys	Thr	Leu	His	Glu 255	Gly
Asp	Asp	Phe	Gly 260	Lys	Leu	Ala	Leu	Val 265	Asn	Asp	Ala	Pro	Arg 270	Ala	Ala
Ser	Ile	Val 275	Leu	Arg	Glu	Asp	Asn 280	Cys	His	Phe	Leu	Arg 285	Val	Asp	Lys
Glu	Asp 290	Phe	Asn	Arg	Ile	Leu 295	Arg	Asp	Val	Glu	Ala 300	Asn	Thr	Val	Arg
Leu 305	Lys	Glu	His	Asp	Gln 310	Asp	Val	Leu	Val	Leu 315	Glu	Lys	Val	Pro	Ala 320
Gly	Asn	Arg	Ala	Ser 325	Asn	Gln	Gly	Asn	Ser 330	Gln	Pro	Gln	Gln	Lys 335	Tyr
Thr	Val	Met	Ser 340	Gly	Thr	Pro	Glu	Lys 345	Ile	Leu	Glu	His	Phe 350	Leu	Glu
Thr	Ile	Arg 355	Leu	Glu	Ala	Thr	Leu 360	Asn	Glu	Ala	Thr	Asp 365	Ser	Val	Leu
Asn	Asp 370	Phe	Ile	Met	Met	His 375	Cys	Val	Phe	Met	Pro 380	Asn	Thr	Gln	Leu
Cys 385	Pro	Ala	Leu	Val	Ala 390	His	Tyr	His	Ala	Gln 395	Pro	Ser	Gln	Gly	Thr 400
Glu	Gln	Glu	Lys	Met 405	Asp	Tyr	Ala	Leu	Asn 410	Asn	Lys	Arg	Arg	Val 415	Ile
Arg	Leu	Val	Leu 420	Gln	Trp	Ala	Ala	Met 425	Tyr	Gly	Asp	Leu	Leu 430	Gln	Glu
Asp	Asp	Val 435	Ser	Met	Ala	Phe	Leu 440	Glu	Glu	Phe	Tyr	Val 445	Ser	Val	Ser
Asp	Asp	Ala	Arg	Met	Ile	Ala	Ala	Leu	Lys	Glu	Gln	Leu	Pro	Glu	Leu

450					455					460					
Glu	Lys	Ile	Val	Lys	Gln	Ile	Ser	Glu	Asp	Ala	Lys	Ala	Pro	Gln	Lys
465					470					475					480
Lys	His	Lys	Val	Leu	Leu	Gln	Gln	Phe	Asn	Thr	Gly	Asp	Glu	Arg	Ala
				485					490					495	
Gln	Lys	Arg	Gln	Pro	Ile	Arg	Gly	Ser	Asp	Glu	Val	Leu	Phe	Lys	Val
			500					505					510		
Tyr	Cys	Met	Asp	His	Thr	Tyr	Thr	Thr	Ile	Arg	Val	Pro	Val	Ala	Thr
		515					520					525			
Ser	Val	Lys	Glu	Val	Ile	Ser	Ala	Val	Ala	Asp	Lys	Leu	Gly	Ser	Gly
	530					535					540				
Glu	Gly	Leu	Ile	Ile	Val	Lys	Met	Ser	Ser	Gly	Gly	Glu	Lys	Val	Val
545					550					555					560
Leu	Lys	Pro	Asn	Asp	Val	Ser	Val	Phe	Thr	Thr	Leu	Thr	Ile	Asn	Gly
				565					570					575	
Arg	Leu	Phe	Ala	Cys	Pro	Arg	Glu	Gln	Phe	Asp	Ser	Leu	Thr	Pro	Leu
			580					585						590	
Pro	Glu	Gln	Glu	Gly	Pro	Thr	Val	Gly	Thr	Val	Gly	Thr	Phe	Glu	Leu
		595					600					605			
Met	Ser	Ser	Lys	Asp	Leu	Ala	Tyr	Gln	Met	Thr	Ile	Tyr	Asp	Trp	Glu
	610					615					620				
Leu	Phe	Asn	Cys	Val	His	Glu	Leu	Glu	Leu	Ile	Tyr	His	Thr	Phe	Gly
625					630					635					640
Arg	His	Asn	Phe	Lys	Lys	Thr	Thr	Ala	Asn	Leu	Asp	Leu	Phe	Leu	Arg
				645					650					655	
Arg	Phe	Asn	Glu	Ile	Gln	Phe	Trp	Val	Val	Thr	Glu	Ile	Cys	Leu	Cys
			660					665					670		
Ser	Gln	Leu	Ser	Lys	Arg	Val	Gln	Leu	Leu	Lys	Lys	Phe	Ile	Lys	Ile
		675					680					685			
Ala	Ala	His	Cys	Lys	Glu	Tyr	Lys	Asn	Leu	Asn	Ser	Phe	Phe	Ala	Ile
	690					695					700				
Val	Met	Gly	Leu	Ser	Asn	Ile	Ala	Val	Ser	Arg	Leu	Ala	Leu	Thr	Trp
705					710					715					720
Glu	Lys	Leu	Pro	Ser	Lys	Phe	Lys	Lys	Phe	Tyr	Ala	Glu	Phe	Glu	Ser
				725					730					735	
Leu	Met	Asp	Pro	Ser	Arg	Asn	His	Arg	Ala	Tyr	Arg	Leu	Thr	Val	Ala
			740					745					750		
Lys	Leu	Glu	Pro	Pro	Leu	Ile	Pro	Phe	Met	Pro	Leu	Leu	Ile	Lys	Asp
		755					760					765			
Met	Thr	Phe	Thr	His	Glu	Gly	Asn	Lys	Thr	Phe	Ile	Asp	Asn	Leu	Val
	770					775					780				
Asn	Phe	Glu	Lys	Met	Arg	Met	Ile	Ala	Asn	Thr	Ala	Arg	Thr	Val	Arg
785					790					795					800
Tyr	Tyr	Arg	Ser	Gln	Pro	Phe	Asn	Pro	Asp	Ala	Ala	Gln	Ala	Asn	Lys
				805					810					815	
Asn	His	Gln	Asp	Val	Arg	Ser	Tyr	Val	Arg	Gln	Leu	Asn	Val	Ile	Asp

[illegible]